

WHAT IS CLAIMED IS:

1. A method of producing a synthetic fuel, said method comprising the steps of:
  - (a) preparing an enhanced tall-oil mix comprising a tall-oil-mix and a chemical change enhancer; and
  - (b) reacting said enhanced tall-oil mix with coal fines so as to obtain said synthetic fuel.
2. The method of claim 1, wherein said enhanced tall-oil-mix includes approximately 10% of said chemical-change enhancer.
3. The method of claim 1, wherein said chemical-change enhancer includes one or more of materials from a group consisting of PVA, EVA, urea, glycol, lignosulfonate, beet sugar bottoms, molasses, corn bottoms, brewery bottoms, vegetable tall oil, vegetable oil, and spent frying oil.
4. The method of claim 3, wherein if said chemical-change enhancer is vegetable oil or spent frying oil, said tall-oil-mix includes approximately 25% of said chemical-change enhancer.
5. The method of claim 1, wherein said coal fines are bituminous coal fines.
6. The method of claim 1, wherein said preparing said enhanced tall-oil-mix of said step (a) is performed prior to said step (b).
7. The method of claim 1, wherein said preparing said enhanced tall-oil-mix of said step (a) occurs simultaneous with said step (b).
8. A synthetic fuel produced by the method of claim 1.

9. The synthetic fuel of claim 8, wherein said coal fines are metallurgical bituminous coal fines.
10. A method of producing a synthetic fuel, said method comprising the steps of:
  - (a) combining a tall-oil mix with a caustic solution and water to form a combination tall-oil mix;
  - (b) combining said combination tall-oil mix with tar decanter sludge to form a TDS-tall-oil mix; and
  - (c) reacting said TDS-tall-oil mix with coal fines so as to obtain said synthetic fuel.
11. The method of claim 10, wherein said coal fines are bituminous metallurgical coal fines.
12. The method of claim 10, wherein said step (a) includes the step of adding a chemical change enhancer to said tall-oil mix to obtain an enhanced-TDS-tall-oil mix in said step (b), and said step (c) includes reacting said enhanced-TDS-tall-oil mix with said coal fines.
13. The method of claim 12, wherein said chemical-change enhancer includes one or more of materials from a group consisting of PVA, EVA, urea, glycol, lignosulfonate, beet sugar bottoms, molasses, corn bottoms, brewery bottoms, vegetable tall oil, vegetable oil, and spent frying oil.
14. The method of claim 10, wherein a thinning agent is added to said enhanced-TDS-tall-oil mix.
15. The method of claim 14, wherein said thinning agent is light cycle oil.

16. The method of claim 12, wherein approximately 0.5% to approximately 0.9% of said synthetic fuel is said enhanced-TDS-tall-oil mix.
17. The method of claim 16, wherein approximately 0.64% of said synthetic fuel is said enhanced-TDS-tall-oil mix.
18. The method of claim 16, wherein said approximately 0.64% of said enhanced-TDS-tall-oil mix is approximately 0.29% tar decanter sludge and a thinning agent and approximately 0.35% of said combination tall-oil mix.
19. The method of claim 18, wherein said 0.35% of said combination tall-oil mix comprises approximately 28% tall oil mix, approximately 55% chemical-change enhancer, approximately 8% of a 20% caustic solution, and approximately 9% water.
20. The method of claim 12, wherein said enhanced-TDS-tall-oil mix includes at least approximately 15% of said tall-oil-mix.
21. The method of claim 10, further comprising the step of:  
(d) heating said tar decanter sludge prior to forming said TDS-tall-oil mix.
22. The method of claim 10, further comprising the step of:  
(d) grinding said TDS-tall-oil mix prior to said step (c).
23. The method of claim 22, further comprising the step of:  
(e) recirculating said TDS-tall-oil mix through said step (d) prior to said step (b).
24. The method of claim 24, further comprising the step of:  
(d) heating said tar decanter sludge and said thinning agent prior to forming said TDS-tall-oil mix.

25. The method of claim 24, further comprising the step of:
  - (e) grinding said TDS-tall-oil mix prior to said step (c).
26. The method of claim 25, further comprising the step of:
  - (f) recirculating said TDS-tall-oil mix through said step (d) prior to said step (c).
27. The method of claim 10, further comprising the step of:
  - (d) heating said TDS-tall-oil-mix to a temperature within a range of approximately 100 to approximately 135 degrees F after said step (b).
28. The method of claim 27, wherein said TDS-tall-oil mix is heated to approximately 123 degrees F.
29. The method of claim 10, further comprising the step of:
  - (d) heating said combination tall-oil-mix prior to said step (b).
30. The method of claim 29, wherein said combination tall-oil-mix is heated to approximately 100 degrees F.
31. A synthetic fuel produced by the method of Claim 10.
32. A synthetic fuel comprising:
  - coal fines; and
  - a chemical change agent comprising a tall-oil mix, a caustic solution and water, and tar decanter sludge (TDS);
  - wherein said chemical change agent and said coal fines are combined and processed so as to maximize contact between said mix and said raw coal.

33. The synthetic fuel of claim 32, wherein said chemical change agent further comprises a thinning agent.
34. The synthetic fuel of claim 33, wherein said thinning agent is light cycle oil.
35. The synthetic fuel of claim 31, wherein said chemical change agent further comprises an enhancer.
36. The synthetic fuel of claim 35, wherein said enhancer includes one or more of materials from a group consisting of PVA, EVA, urea, glycol, lignosulfonate, beet sugar bottoms, molasses, corn bottoms, brewery bottoms, vegetable tall oil, vegetable oil, and spent frying oil.
37. The synthetic fuel of claim 32, wherein said coal fines are metallurgical bituminous coal fines.
38. A synthetic fuel comprising coal fines and an enhanced-tall-oil-mix, wherein said enhanced-tall-oil-mix comprises a tall-oil mix and a chemical-change enhancer, wherein said coal fines are treated with said enhanced-tall-oil-mix so as to maximize contact between said coal fines and said enhanced-tall-oil-mix.
39. The synthetic fuel of claim 38, wherein said enhanced-tall-oil-mix comprises approximately 90% tall-oil-mix and 10% chemical-change enhancer.
40. The synthetic fuel of claim 38, wherein said chemical-change enhancer includes one or more of materials from a group consisting of PVA, EVA, urea, glycol, lignosulfonate, beet sugar bottoms, molasses, corn bottoms, brewery bottoms, vegetable tall oil, vegetable oil, and spent frying oil.

41. The synthetic fuel of claim 40, wherein if said chemical-change enhancer is vegetable oil or spent frying oil, said tall-oil-mix includes approximately 25% of said chemical-change enhancer.

42. The synthetic fuel of claim 38, wherein said coal fines are metallurgical bituminous coal fines.